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Correlation between Growth Inhibitory Exhibition and Suspected Allelochemicals (Phenolic Compounds) in the Extract of Alfalfa (*Medicago sativa* L.)

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Abstract: Acidic fractions of the extracts from the three alfalfa cultivars Batasu, Rasen, and Yuba exhibited a varietial difference in the inhibitory effect on hypocotyls and radicle growth of alfalfa (cv. Nasuwakaba) and rice (cv. Koshihikari) seedlings. The extract from Rasen possessed the strongest inhibitory activity, and that of Batasu was the lowest. In a TLC bioassay with lettuce seedlings, inhibitory zones of the extracts were located at an Rf value of 0.6-0.8, and maximum exhibitory zones at Rfs of 0.7-0.8. However, the extracts of Rasen and Yuba contained an additional inhibitory zone at Rf of 0.1-0.2. Inhibitory zones were analyzed by HPLC. Eight phenolic compounds were identified in the extracts from Rasen and Batasu, and six compounds in that from Yuba. However, the content of these phenolic compounds varied with the cultivar. The content of each phenolic compound was the highest in Rasen, followed by Yuba and Batasu, although the content of *p*-hydroxybenzoic acid was equivalent in all cultivars. We suppose that the degree of inhibitory exhibition of allelopathy may be related to the presence and concentrations of allelochemicals (phenolic compounds), however, the allelopathic activity of the plant might be determined by interactions of all these compounds, not just a single chemical.

Keywords: Bioassay, HPLC, Inhibition, Phenolic acids, TLC, Varietal difference

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